$\pm 0''.082$ and $\pm 0''.045$ for photographs taken with the two instruments respectively. With the parallactic factor of October 26 and October 27, it results that two of the Thompson plates at the beginning of the evening compared with two at the end are sufficient to give the solar parallax with a probable accidental error of $\pm 0''.016$. We may therefore expect an adequate result for the somewhat arduous measurements and reductions involved.

No observations were made with the spectroscope during the year.

The solar activity increased considerably during the year ending May 10, the sun being free from spots on only 25 days, as against 190 in the previous year. The mean daily spotted area for 1903 is nearly six times as great as for 1902; still, as yet, the rate of increase is not so great as in the corresponding periods of the two preceding cycles. The greatest outburst of the year commenced on 1903 October 5, with the appearance at the east limb of the sun of a group of spots much larger than any seen since 1898 September. Several fine groups have appeared since.

The principal results for the magnetic elements for 1903 are as follows:—

Mean declination	16° 19′·1 West.
Mean horizontal force	4·0132 (in British units).
	1·8504 (in Metric units).
Mean dip (with 3-inch needles)	67° 0′ 51″.

The magnetic disturbances in 1903 have shown a marked increase in number and extent. There were five days of great magnetic disturbance and seven of lesser disturbance. Traces of the photographic curves for these days will be published in the annual volume. The calculation of diurnal inequalities from five typical quiet days in each month, selected in concert with M. Moureaux and Dr. Chree, has been continued.

The mean temperature for the year 1903 was 50°·2, or 0°·7 above the average for the fifty years 1841–90. During the twelve months ending 1904 April 30, the highest temperature in the shade was 87°·5 on July 14. The highest temperature in the Stevenson screen was 84°·2, and in the observatory grounds 85°·0, on the same day. The lowest temperature of the air recorded in the year was 23°·8 on January 1. During the winter there were forty-three days on which the temperature fell below 32°·0, being thirteen days below the average number.

The mean daily horizontal movement of the air in the year ending 1904 April 30 was 300 miles, which is 18 miles below the average of the preceding thirty-six years. The greatest recorded movement was 796 miles on February 13, and the least 69 miles on January 23. The greatest recorded pressure of the wind was 36 lb. on the square foot on September 10, and the greatest hourly velocity 43 miles on September 10 and 11.

During the year 1903, Osler's anemometer showed an excess of sixteen revolutions of the vane in the positive direction N., E., S., W., N., excluding the turnings which are evidently accidental.

The number of hours of bright sunshine recorded during the twelve months ending 1904 April 30, by the Campbell-Stokes instrument, was 1361 out of 4472 hours during which the sun was above the horizon, so that the mean proportion of sunshine for the year was 0·304, constant sunshine being represented by 1.

The rainfall for the year ending 1904 April 30 was 35·42 inches, being 10·88 inches greater than the average of the fifty years 1841–90. The number of rainy days was 182. The rainfall during 1903 was 35·54 inches, the heaviest ever recorded at Greenwich during the calendar year. The summer months in particular were very wet, more than 16 inches being recorded in June, July, and August, viz. 6·07 inches registered in June, 5·27 inches in July, and 4·82 inches in August. The greatest fall registered at Greenwich in a single day for many years past, viz. 2·46 inches, occurred on July 23. In 1904, January and February were wet months, so that the total fall from 1903 March 1 to 1904 February 29 was more than 37 inches.

The determination of the longitude of Potsdam by Prof. Albrecht and Dr. Wanach was completed in July. The result, which has been recently published by Prof. Albrecht, leads to an indirect determination of the longitude of Paris which is in close accordance with the results obtained by the Greenwich observers in 1902.

The revision of Groombridge's Catalogue for 1810, in connection with the Greenwich Second Ten Year Catalogue (1890), and the determination of the proper motions of about 4000 stars from Groombridge's observations, compared with recent Greenwich observations at an interval of about eighty years, have now been completed under Mr. Thackeray's supervision, and the results will be published without delay.

HIGHER SCIENTIFIC EDUCATION IN FRANCE.

AT one of a series of education conferences held recently at the École des Hautes Études Sociales in Paris, Prof Appell, of the University of Paris, delivered an important address on the present facilities provided in France for higher instruction in the various branches of science, paying special attention to institutions established for this purpose in Paris. The address is published in the *Revue générale des Sciences* for March 30 last.

The address opened with a general historical account of the evolution of current estimates of the importance of scientific education of university standing and of the stages in the growth of French institutions in which such higher instruction is now given. Prof. Appell then recapitulated concisely the actual organisation of higher scientific teaching in existing schools and colleges in France, and supplemented his survey by indicating various improvements he considered desirable. Agreeing with British men of science, he urged that students must from the beginning of their work be led to avoid "une tendance fâcheuse à se contenter d'apprendre et de répéter la parole du maître," and that the object of all teaching should be to develop the scientific spirit and to encourage in the students a desire to apply to everything the methods of research.

The succeeding section of the discourse was concerned with scientific education in its relations to the practical applications of science to the needs of industry. A very liberal interpretation was given to the expression "technical" school, and the term was used to include such institutions as the schools of pharmacy, schools of mines, and agricultural colleges. Prof. Appell pleaded for a differentiation of the functions of the numerous establishments in which higher scientific education is being given, and in speaking of the work of all these technical schools, emphasised the great importance of insisting upon a good basis of general scientific knowledge on which to rest all instruction in technology. The absence of a due co-ordination of the work of existing scientific institutions in Paris was then pointed out, and a scheme outlined indicating the changes and developments desirable in order to realise "une union féconde entre la science et les applications."

The concluding subject of the address appeals in an especial manner to readers of NATURE. In it Prof. Appell indicated the increasing need in modern times for every great nation to encourage scientific research liberally. He condemned the danger most likely to exist in a democracy of judging the importance of a chair or lectureship at a university by the number of students it attracts; the test ought rather to be, it was pointed out, the number of discoveries which can be associated with a given laboratory or the amount of research work done in connection with it. The fallacy of disparaging new results in science because at the time they appear only of theoretical interest was demonstrated by reference to the researches of Newton and Pasteur. Suggestions were then made as to how to encourage the best students of science to devote a number of years to research work, and also in the direction of ensuring the most scientific and economical arrangement of buildings intended for research work in science. As an example, Prof. Appell referred to one of the needs of the University of Paris. This want was described as the creation on a large site, distinct from the Sorbonne, of an institute of chemistry, where laboratories for, and advanced instruction in, inorganic, organic, biological, and technical chemistry could all be found under the same roof, instead of being situated, as they actually are, in three distinct parts of Paris.

The concluding portion of the address is a powerful plea for the adequate endowment of research of all kinds. As Prof. Appell showed, it is in research laboratories that advances in industrial processes are really made, and it is a wise economy to encourage the foundation of such institutions. The discourse should have an immediate beneficial effect on the further supply of higher scientific education in France, and it is probable that the lessons drawn by Prof. Appell from Charlottenburg and from similar American technical institutes will serve to demonstrate to French statesmen the importance of the subject with which the address deals with such ability.

SOFT CHEESE-MAKING IN THE HOME COUNTIES.

IN the rapid increase of grass land during the last thirty years, farming in the Home Counties has seen a remarkable change. The exhaustion of land by the too frequent growth of cereals during the period of high prices, and the fall in the price of corn since, made corn, as the main product of farming, unprofitable to cultivate in part of this district. The land has been laid, or in too many cases has been allowed to lay itself, down to grass, and, instead of corn, milk has now become the principal agricultural product. This change is most noticeable within a circle having London for its centre and a radius of thirty or forty miles, for milk is both bulky and perishable, and railway charges and time in transit both desiderate its production near the great centre of consumption.

It must not be supposed that the greater part of this area is particularly well suited for grazing purposes. On the contrary, unlike the west country, or the polders of Holland, where second year's grass has all the appearance of an old pasture, it takes twenty years to produce a good pasture on the London-clay or Boulder-clay soils. It was one of the most mischievous effects of the high price of corn in the middle of the last century that the good old pastures, which formed perhaps one-third of most of the farms, were broken up. Besides, even when a good pasture has been produced, the climate is not humid enough in summer to produce an abundant growth; it is rare to get more than one cut of meadow-hay in a season, and the aftermath generally provides indifferent grazing. Per acre, the returns in milk are therefore not great. No doubt the output might be greatly increased by introducing the Danish system of dairy-farming, *i.e.* growing a succession of green tillage crops for feeding the cows instead of pasturing them, but the scarcity of cheap labour, which is the most serious drawback to intensive farming in the neighbourhood of London, prohibits the practice of this system.

The time of year when the milk production is greatest is the month of May. From observations made in Essex last year it was found that the yield of milk in May was about 20 per cent. greater than in the winter, while during the summer it fell off to an equal extent as the quality of the grazing deteriorated. The consumption of milk in London, on the other hand, fluctuates but little, and farmers must therefore limit their sale to their minimum output, and are unable to take advantage of the flush of milk in the spring to increase their returns.

It is clear that dairy-farmers require some outlet for this surplus milk. To give it to the calves and pigs is to utilise it for a purpose for which foods purchased at half the price per food unit would serve equally well. Taking everything into consideration, the use to which it could most profitably be put is in the making of soft cheese, for which there is a ready demand whenever placed on the London market. Soft cheese-making requires none of the expensive appliances and little of the storage that are necessary for hard cheese-making, and there is nothing to hinder its being carried out on any farm. But it needs knowledge and skill, and this is a subject of agricultural instruction, therefore, which the education committees in the Home Counties could most usefully provide.

Very opportunely, a little handbook on soft cheese-making has recently appeared,[1] for the preparation of which the authors, in virtue of their experience at Reading and Wye, are particularly qualified. First and foremost they lay stress on the need for cleanliness in the handling of milk, for, as they point out, taints are far more noticeable, because further developed, in soft cheese than in the milk from which it is made. But even in the production of milk for sale, reform in the matter of cleanliness is badly needed. Nowhere probably in the whole of Europe are cows kept in a filthier condition than in parts of England and Wales, and it is not unknown to find in milk a sediment of hair, dust and dung, which points to dirty cattle. In Holland and Hungary the cows are regularly groomed, and this is not only done to prevent contamination of the milk, but also because the cows, being made more comfortable, do better and give more milk. Besides dirtiness of the cows, contamination of milk is due to a variety of causes—dust blowing in an ill-kept, windy byre, neglect of the milkers to wash their hands before milking or to put on a clean over-jacket, the use of impure water for washing pails and churns, &c., and it must be remembered that not only is such contamination an injury to the public, but it is sometimes the cause of loss to the farmers themselves when milk is returned to them as unsaleable. Short courses of instruction in the handling of milk for farmers and farm hands are badly needed. It may be doubted whether, without systematic science training, all the sources of bacterial contamination of milk can ever be guarded against, and it is to be urged that the county education committees should also provide for instruction in dairy bacteriology for those who, though a limited few, will, when distributed through the farming community, gradually spread the knowledge of the possible sources of bacterial contamination.

Once the principles of cleanliness have been mastered, the making of soft cheese is merely a matter of practice and attention to the details which are admirably set out in this little handbook. Of the sorts of cheese for making which directions are given, Bondon, Coulommier and Cambridge may be specially recommended, because they are milk cheeses and will consume the whole of the surplus milk on a farm, and because they need no ripening, and therefore require no storage accommodation. For the first-named especially there is known to be a good demand in London. They can all be made at any farm where a room capable of being kept at a uniform temperature is available, by the purchase of 5*l.* worth of appliances.

This is only one of the directions in which education committees in the Home Counties can directly aid the new style of farming, and in the neglect of which they will lose a splendid opportunity for usefulness. Greater productiveness of the land by more rational manuring, more economical feeding of dairy cattle, and improvement in the milk-producing qualities of dairy herds, are also needed to make the industry fairly profitable. In the writer's experience the majority of farmers feel their difficulties far too acutely to reject any means of improvement which are provided in a form of which they can make practical use.

T. S. D.

[1] "The Practice of Soft Cheese-making." By C. W. Walker-Tisdale, F.I.C., and T. R. Robinson, F.S.I. Pp. 51. (London: Office of the *Dairy World* and *British Dairy Farmer*, 1903.) Price 1*s*.

INHERITANCE OF PSYCHICAL AND PHYSICAL CHARACTERS IN MAN.[1]

IN his Huxley lecture, Prof. Karl Pearson gives the result of a prolonged investigation into the inheritance of the mental and moral characters in man (see NATURE, vol. lxviii. p. 607, October 22, 1903). His main conclusion is a remarkable one; it is that "the physical and psychical characters in man are inherited within broad lines in the same manner, and with the same intensity. . . . We inherit our parents' tempers, our parents' conscientiousness, shyness and ability, even as we inherit their stature, forearm and span."

Great as are the obstacles in the way of a precise determination of the power of heredity in the physical sphere, those in the psychical are far greater. This arises partly from the difficulty of obtaining trustworthy evidence in the

[1] "On the Inheritance of the Mental and Moral Characters in Man, and its Comparison with the Inheritance of the Physical Characters." The Huxley Lecture for 1903. By Prof. Karl Pearson, F.R.S. Pp. 179–237. (Published by the Anthropological Institute of Great Britain and Ireland, 3 Hanover Square, London, W.)